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## WHAT IS CLAIMED IS:

1. A magnetic head comprising:
  - a substrate having a principal surface;
  - an antistripping layer formed on the principal surface of said substrate;
  - a first magnetic layer formed on said antistripping layer;
  - a recording gap layer formed on said first magnetic layer;
  - an insulating layer formed on said recording gap layer except for a pole tip region;
  - a write coil enclosed with and insulated by said insulating layer; and
  - a second magnetic layer formed on said insulating layer and on the pole tip region of said recording gap layer.
2. A magnetic head as claimed in Claim 1, wherein said antistripping layer comprises:
  - a non-magnetic layer formed on the principal surface of said substrate; and
  - a conductive layer formed on said non-magnetic layer, said first magnetic layer being formed on said conductive layer.
3. A magnetic head as claimed in Claim 2, wherein said non-magnetic layer comprises a lamina made of metal selected from the group consisting essentially of titanium (Ti), tantalum (Ta), chromium (Cr), yttrium (Y), zirconium (Zr), hafnium (Hf), vanadium (V), niobium (Nb), molybdenum (Mo), and tungsten (W).

4. A magnetic head as claimed in Claim 3, wherein said lamina comprises one selected from a single-layer film, a multi-layer film, and an alloy film.

5. A magnetic head as claimed in Claim 2, wherein said non-magnetic layer is made of a non-magnetic material of titanium (Ti), said non-magnetic layer having a thickness between 2nm and 10nm, both inclusive.

6. A magnetic head as claimed in Claim 2, wherein said non-magnetic layer is made of a non-magnetic material of tantalum (Ta), said non-magnetic layer having a thickness between 1.5nm and 10nm, both inclusive.

7. A magnetic head as claimed in Claim 2, wherein said non-magnetic layer is made of a non-magnetic material of chromium (Cr), said non-magnetic layer having a thickness between 2.5nm and 10nm, both inclusive.

8. A magnetic head as claimed in Claim 2, wherein said non-magnetic layer comprises a lamina made of metal having a tensile stress.

9. A magnetic head as claimed in Claim 8, wherein said lamina comprises one selected from a single-layer film, a multi-layer film, and an alloy film.

10. A magnetic head as claimed in Claim 1, wherein said first magnetic layers comprise a lamina selected from the group consisting essentially of cobalt-iron-nickel (CoFeNi), cobalt-iron-copper (CoFeCu), cobalt-iron-molybdenum (CoFeMo), cobalt-iron-boron (CoFeB), and cobalt-iron (CoFe).

11. A magnetic head as claimed in Claim 10, wherein said lamina comprises alloy.

12. A magnetic head as claimed in Claim 10, wherein said lamina comprises one selected from a single-layer film and a multi-layer film.

13. A magnetic head as claimed in Claim 10, wherein said lamina comprises a mixture.

14. A magnetic head as claimed in Claim 13, wherein said mixture further comprises an additional alloy consisting essentially of nickel-iron (NiFe).

15. A magnetic head as claimed in Claim 1, wherein said first magnetic layer comprises essential elements of cobalt (Co), nickel (Ni), and iron (Fe)

16. A magnetic head as claimed in Claim 1, wherein said first magnetic layer comprises a laminated structure of a first magnetic sub-layer comprising essential elements of cobalt (Co), nickel (Ni), and iron (Fe) and a second magnetic sub-layer comprising essential elements of nickel (Ni) and iron (Fe), said first magnetic sub-layer being disposed near to said recording gap layer.

17. A magnetic head as claimed in Claim 15, wherein said first magnetic layer has a crystal structure of a face-centered cubic (fcc) structure.

18. A magnetic head as claimed in Claim 15, wherein said first magnetic layer has a crystal structure of a body-centered cubic (bcc) structure.

19. A magnetic head as claimed in Claim 15, wherein said first magnetic layer has a crystal structure of a mixed crystal with a face-centered cubic (fcc) structure and a body-centered cubic (bcc) structure.

20. A magnetic head as claimed in Claim 16, wherein said first magnetic sub-layer has a crystal structure of a face-centered cubic (fcc) structure.

21. A magnetic head as claimed in Claim 16, wherein said first magnetic sub-layer has a crystal structure of a body-centered cubic (bcc) structure.

22. A magnetic head as claimed in Claim 16, wherein said first magnetic sub-layer has a crystal structure of a mixed crystal with a face-centered cubic (fcc) structure and a body-centered cubic (bcc) structure.

23. A magnetic head as claimed in Claim 15, wherein said first magnetic layer has a crystal particle diameter which is not more than 20nm.

24. A magnetic head as claimed in Claim 16, wherein said first magnetic sub-layer has a crystal particle diameter which is not more than 20nm.

25. A magnetic head as claimed in Claim 1, wherein a combination of said insulating layer and said write coil is made by successively laminating a first insulating layer, said write coil, and a second insulating layer on said recording gap layer, said second insulating layer having a periphery end on a side of an air bearing surface (ABS) that is close to said air bearing surface than a periphery end of said first insulating layer.

26. A magnetic head as claimed in Claim 1, wherein said substrate comprises:

an insulating substrate having a principal surface;

a first magnetic shield layer formed on the principal surface of said insulating substrate;

a magnetic separation layer formed on said first magnetic shield layer, said magnetic separation layer being made of an insulator; and

a magneto-resistive effective element sandwiched in said magnetic separation layer, said antistripping layer being formed on said magnetic separation layer, said first magnetic layer doubling as a second magnetic shield layer.

27. A process for manufacturing a magnetic head as claimed in Claim 1, wherein said first magnetic layers is made by electroplating.

28. A process for manufacturing a magnetic head as claimed in Claim 15, wherein said first magnetic layer is made by electroplating.

29. A process for manufacturing a magnetic head as claimed in Claim 16, wherein said first magnetic sub-layer is made by electroplating.

30. A process for manufacturing a magnetic head as Claimed in claim 15, wherein said first magnetic layer is made by electroplating with a plating bath including no stress relieving agent.

31. A process for manufacturing a magnetic head as Claimed in Claim 16, wherein said first magnetic sub-layer is made by electroplating with a plating bath including no stress relieving agent.

32. A magnetic storage unit comprising a magnetic head as claimed in Claim 1 and a magnetic recording medium which has a coercive force of 278600 A/m or more and which has a recording density of 10 gigabits/inch<sup>2</sup> or more.

33. A magnetic storage unit comprising a magnetic head as claimed in Claim 2 and a magnetic recording medium which has a coercive force of 278600 A/m or more and which has a recording density of 10 gigabits/inch<sup>2</sup> or more.

34. A magnetic storage unit comprising a magnetic head as claimed in Claim 15 and a magnetic recording medium which has a coercive force of 278600 A/m or more and which has a recording density of 10 gigabits/inch<sup>2</sup> or more.

35. A magnetic storage unit comprising a magnetic head as claimed in Claim 25 and a magnetic recording medium which has a coercive force of 278600 A/m or more and which has a recording density of 10 gigabits/inch<sup>2</sup> or more.

36. A magnetic storage unit comprising a magnetic head as claimed in Claim 26 and a magnetic recording medium which has a coercive force of 278600 A/m or more and which has a recording density of 10 gigabits/inch<sup>2</sup> or more.

37. A magnetic head comprising:

a substrate having a principal surface;

a first magnetic layer formed on said substrate;

a recording gap layer formed on said first magnetic layer;

an insulating layer formed on said recording gap layer except for a pole tip region;

a write coil enclosed with and insulated by said insulating layer;

an antistripping layer formed on said insulating layer and on the pole tip region of said recording gap layer; and

a second magnetic layer formed on said antistripping

layer.

38. A magnetic head as claimed in Claim 37, wherein said antistripping layer comprises:

a non-magnetic layer formed on said insulating layer and on the pole tip region of said recording gap layer; and

a conductive layer formed on said non-magnetic layer, said second magnetic layer being formed on said conductive layer.

39. A magnetic head as claimed in Claim 38, wherein said non-magnetic layer a lamina made of metal selected from the group consisting essentially of titanium (Ti), tantalum (Ta), chromium (Cr), yttrium (Y), zirconium (Zr), hafnium (Hf), vanadium (V), niobium (Nb), molybdenum (Mo), and tungsten (W).

40. A magnetic head as claimed in Claim 39, wherein said lamina comprises one selected from a single-layer film, a multi-layer film, and an alloy film.

41. A magnetic head as claimed in Claim 38, wherein said non-magnetic layer is made of a non-magnetic material of titanium (Ti), said non-magnetic layer having a thickness between 10nm and 290nm, both inclusive.

42. A magnetic head as claimed in Claim 38, wherein said non-magnetic layer is made of a non-magnetic material of tantalum (Ta), said non-magnetic layer having a thickness between 8nm and 290nm, both inclusive.

43. A magnetic head as claimed in Claim 38, wherein said non-magnetic layer is made of a non-magnetic material of chromium (Cr), said non-magnetic layer having a thickness between 12nm and 290nm, both inclusive.



44. A magnetic head as claimed in Claim 38, wherein said non-magnetic layer comprises a lamina made of metal having a tensile stress.

45. A magnetic head as claimed in Claim 44, wherein said lamina comprises one selected from a single-layer film, a multi-layer film, and an alloy film.

46. A magnetic head as claimed in Claim 37, wherein said first magnetic layers comprise a lamina selected from the group consisting essentially of cobalt-iron-nickel (CoFeNi), cobalt-iron-copper (CoFeCu), cobalt-iron-molybdenum (CoFeMo), cobalt-iron-boron (CoFeB), and cobalt-iron (CoFe).

47. A magnetic head as claimed in Claim 46, wherein said lamina comprises alloy.

48. A magnetic head as claimed in Claim 46, wherein said lamina comprises one selected from a single-layer film and a multi-layer film.

49. A magnetic head as claimed in Claim 46, wherein said lamina comprises a mixture.

50. A magnetic head as claimed in Claim 49, wherein said mixture further comprises an additional alloy consisting essentially of nickel-iron (NiFe).

51. A magnetic head as claimed in Claim 37, wherein said second magnetic layer comprises essential elements of cobalt (Co), nickel (Ni), and iron (Fe).

52. A magnetic head as claimed in Claim 37, wherein said second magnetic layer comprises a laminated structure of a first magnetic sub-layer comprising essential elements of cobalt (Co), nickel (Ni), and iron (Fe) and a second magnetic sub-layer

comprising essential elements of nickel (Ni) and iron (Fe), said first magnetic sub-layer being disposed near to said recording gap layer.

53. A magnetic head as claimed in Claim 51, wherein said second magnetic layer has a crystal structure of a face-centered cubic (fcc) structure.

54. A magnetic head as claimed in Claim 51, wherein said second magnetic layer has a crystal structure of a body-centered cubic (bcc) structure.

55. A magnetic head as claimed in Claim 51, wherein said second magnetic layer has a crystal structure of a mixed crystal with a face-centered cubic (fcc) structure and a body-centered cubic (bcc) structure.

56. A magnetic head as claimed in Claim 52, wherein said first magnetic sub-layer has a crystal structure of a face-centered cubic (fcc) structure.

57. A magnetic head as claimed in Claim 52, wherein said first magnetic sub-layer has a crystal structure of a body-centered cubic (bcc) structure.

58. A magnetic head as claimed in Claim 52, wherein said first magnetic sub-layer has a crystal structure of a mixed crystal with a face-centered cubic (fcc) structure and a body-centered cubic (bcc) structure.

59. A magnetic head as claimed in Claim 51, wherein said second magnetic layer has a crystal particle diameter which is not more than 20nm.

60. A magnetic head as claimed in Claim 52, wherein said first magnetic sub-layer has a crystal particle diameter which

is not more than 20nm.

61. A magnetic head as claimed in Claim 37, wherein a combination of said insulating layer and said write coil is made by successively laminating a first insulating layer, said write coil, and a second insulating layer on said recording gap layer, said second insulating layer having a periphery end on a side of an air bearing surface (ABS) that is close to said air bearing surface than a periphery end of said first insulating layer.

62. A magnetic head as claimed in Claim 37, wherein said substrate comprises:

an insulating substrate having a principal surface;

a first magnetic shield layer formed on the principal surface of said insulating substrate;

a magnetic separation layer formed on said first magnetic shield layer, said magnetic separation layer being made of an insulator; and

a magneto-resistive effective element sandwiched in said magnetic separation layer, said first magnetic layer being formed on said magnetic separation layer, said first magnetic layer doubling as a second magnetic shield layer.

63. A process for manufacturing a magnetic head as claimed in Claim 37, wherein said second magnetic layer is made by electroplating.

64. A process for manufacturing a magnetic head as claimed in Claim 51, wherein said second magnetic layer is made by electroplating.

65. A process for manufacturing a magnetic head as claimed in Claim 52, wherein said first magnetic sub-layer is

made by electroplating.

66. A process for manufacturing a magnetic head as claimed in Claim 51, wherein said second magnetic layer is made by electroplating with a plating bath including no stress relieving agent.

67. A process for manufacturing a magnetic head as claimed in Claim 52, wherein said first magnetic sub-layer is made by electroplating with a plating bath including no stress relieving agent.

68. A magnetic storage unit comprising a magnetic head as claimed in Claim 37 and a magnetic recording medium which has a coercive force of 278600 A/m or more and which has a recording density of 10 gigabits/inch<sup>2</sup> or more.

69. A magnetic storage unit comprising a magnetic head as claimed in Claim 38 and a magnetic recording medium which has a coercive force of 278600 A/m or more and which has a recording density of 10 gigabits/inch<sup>2</sup> or more.

70. A magnetic storage unit comprising a magnetic head as claimed in Claim 51 and a magnetic recording medium which has a coercive force of 278600 A/m or more and which has a recording density of 10 gigabits/inch<sup>2</sup> or more.

71. A magnetic storage unit comprising a magnetic head as claimed in Claim 61 and a magnetic recording medium which has a coercive force of 278600 A/m or more and which has a recording density of 10 gigabits/inch<sup>2</sup> or more.

72. A magnetic storage unit comprising a magnetic head as claimed in Claim 62 and a magnetic recording medium which has a coercive force of 278600 A/m or more and which has a

recording density of 10 gigabits/inch<sup>2</sup> or more.

73. A magnetic head comprising:

a substrate having a principal surface;

a first antistripping layer formed on the principal surface of said substrate;

a first magnetic layer formed on said first antistripping layer;

a recording gap layer formed on said first magnetic layer;

an insulating layer formed on said recording gap layer except for a pole tip region;

a write coil enclosed with and insulated by said insulating layer;

a second antistripping layer formed on said insulating layer and on the pole tip region of said recording gap layer; and

a second magnetic layer formed on said second antistripping layer.

74. A magnetic head as claimed in Claim 73, wherein said first antistripping layer comprises:

a first non-magnetic layer formed on the principal surface of said substrate; and

a first conductive layer formed on said first non-magnetic layer, said first magnetic layer being formed on said first conductive layer,

said second antistripping layer comprising:

a second non-magnetic layer formed on said insulating layer and on the pole tip region of said recording gap layer;

and

a second conductive layer formed on said second non-magnetic layer, said second magnetic layer being formed on said second conductive layer.

75. A magnetic head as claimed in Claim 74, wherein each of said first and said second non-magnetic layers comprises a lamina made of metal selected from the group consisting of titanium (Ti), tantalum (Ta), chromium (Cr), yttrium (Y), zirconium (Zr), hafnium (Hf), vanadium (V), niobium (Nb), molybdenum (Mo), and tungsten (W).

76. A magnetic head as claimed in Claim 75, wherein said lamina comprises one selected from a single-layer film, a multi-layer film, and an alloy film.

77. A magnetic head as claimed in Claim 73, wherein each of said first and said second non-magnetic layers is made of a non-magnetic material of titanium (Ti), said first non-magnetic layer having a thickness between 2nm and 10nm, both inclusive, said second non-magnetic layer having a thickness between 10nm and 290nm, both inclusive.

78. A magnetic head as claimed in Claim 73, wherein each of said first and said second non-magnetic layers is made of a non-magnetic material of tantalum (Ta), said first non-magnetic layer having a thickness between 1.5nm and 10nm, both inclusive, said second non-magnetic layer having a thickness between 8nm and 290nm, both inclusive.

79. A magnetic head as claimed in Claim 73, wherein each of said first and said second non-magnetic layers is made of a non-magnetic material of chromium (Cr), said first non-

magnetic layer having a thickness between 2.5nm and 10nm, both inclusive, said second non-magnetic layer having a thickness between 12nm and 290nm, both inclusive.

80. A magnetic head as claimed in Claim 74, wherein each of said first and said second non-magnetic layers comprises a lamina made of metal having a tensile stress.

81. A magnetic head as claimed in Claim 80, wherein said lamina comprises one selected from a single-layer film, a multi-layer film, and an alloy film.

82. A magnetic head as claimed in Claim 73, wherein each of said first and said second magnetic layers comprises a lamina selected from the group consisting essentially of cobalt-iron-nickel (CoFeNi), cobalt-iron-copper (CoFeCu), cobalt-iron-molybdenum (CoFeMo), cobalt-iron-boron (CoFeB), and cobalt-iron (CoFe).

83. A magnetic head as claimed in Claim 82, wherein said lamina comprises alloy.

84. A magnetic head as claimed in Claim 82, wherein said lamina comprises one selected from a single-layer film and a multi-layer film.

85. A magnetic head as claimed in Claim 82, wherein said lamina comprises a mixture.

86. A magnetic head as claimed in Claim 85, wherein said mixture further comprises an additional alloy consisting essentially of nickel-iron (NiFe).

87. A magnetic head as claimed in Claim 73, wherein each of said first and said second magnetic layers comprises essential elements of cobalt (Co), nickel (Ni), and iron (Fe).

88. A magnetic head as claimed in Claim 73, wherein each of said first and said second magnetic layers comprises a laminated structure of a first magnetic sub-layer comprising essential elements of cobalt (Co), nickel (Ni), and iron (Fe) and a second magnetic sub-layer comprising essential elements of nickel (Ni) and iron (Fe), said first magnetic sub-layer being disposed near to said recording gap layer.

89. A magnetic head as claimed in Claim 87, wherein each of said first and said second magnetic layers has a crystal structure of a face-centered cubic (fcc) structure.

90. A magnetic head as claimed in Claim 87, wherein each of said first and said second magnetic layers has a crystal structure of a body-centered cubic (bcc) structure.

91. A magnetic head as claimed in Claim 87, wherein each of said first and said second magnetic layers has a crystal structure of a mixed crystal with a face-centered cubic (fcc) structure and a body-centered cubic (bcc) structure.

92. A magnetic head as claimed in Claim 88, wherein said first magnetic sub-layer has a crystal structure of a face-centered cubic (fcc) structure.

93. A magnetic head as claimed in Claim 88, wherein said first magnetic sub-layer has a crystal structure of a body-centered cubic (bcc) structure.

94. A magnetic head as claimed in Claim 88, wherein said first magnetic sub-layer has a crystal structure of a mixed crystal with a face-centered cubic (fcc) structure and a body-centered cubic (bcc) structure.



95. A magnetic head as claimed in Claim 87, wherein each of said first and said second magnetic layers has a crystal particle diameter which is not more than 20nm.

96. A magnetic head as claimed in Claim 88, wherein said first magnetic sub-layer has a crystal particle diameter which is not more than 20nm.

97. A magnetic head as claimed in Claim 73, wherein a combination of said insulating layer and said write coil is made by successively laminating a first insulating layer, said write coil, and a second insulating layer on said recording gap layer, said second insulating layer having a periphery end on a side of an air bearing surface (ABS) that is close to said air bearing surface than a periphery end of said first insulating layer.

98. A magnetic head as claimed in Claim 73, wherein said substrate comprises:

an insulating substrate having a principal surface;

a first magnetic shield layer formed on the principal surface of said insulating substrate;

a magnetic separation layer formed on said first magnetic shield layer, said magnetic separation layer being made of an insulator; and

a magneto-resistive effective element sandwiched in said magnetic separation layer, said first antistripping layer being formed on said magnetic separation layer, said first magnetic layer doubling as a second magnetic shield layer.

99. A process for manufacturing a magnetic head as claimed in Claim 73, wherein each of said first and said second magnetic layers is made by electroplating.

100. A process for manufacturing a magnetic head as claimed in Claim 87, wherein each of said first and said second magnetic layers is made by electroplating.

101. A process for manufacturing a magnetic head as claimed in Claim 88, wherein said first magnetic sub-layer is made by electroplating.

102. A process for manufacturing a magnetic head as claimed in Claim 87, wherein each of said first and said second magnetic layers is made by electroplating with a plating bath including no stress relieving agent.

103. A process for manufacturing a magnetic head as claimed in claim 88, wherein said first magnetic sub-layer is made by electroplating with a plating bath including no stress relieving agent.

104. A magnetic storage unit comprising a magnetic head as claimed in Claim 73 and a magnetic recording medium which has a coercive force of 278600 A/m or more and which has a recording density of 10 gigabits/inch<sup>2</sup> or more.

105. A magnetic storage unit comprising a magnetic head as claimed in Claim 74 and a magnetic recording medium which has a coercive force of 278600 A/m or more and which has a recording density of 10 gigabits/inch<sup>2</sup> or more.

106. A magnetic storage unit comprising a magnetic head as claimed in Claim 87 and a magnetic recording medium which has a coercive force of 278600 A/m or more and which has a recording density of 10 gigabits/inch<sup>2</sup> or more.

107. A magnetic storage unit comprising a magnetic head as claimed in Claim 97 and a magnetic recording medium which

has a coercive force of 278600 A/m or more and which has a recording density of 10 gigabits/inch<sup>2</sup> or more.

108. A magnetic storage unit comprising a magnetic head as claimed in Claim 98 and a magnetic recording medium which has a coercive force of 278600 A/m or more and which has a recording density of 10 gigabits/inch<sup>2</sup> or more.